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IS : 8678 - 1977

*Indian Standard*  
SPECIFICATION FOR  
VEGETABLE PROTEIN-BASED YOGHURT  
( VEGETABLE CURDS )

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## SPECIFICATION FOR VEGETABLE PROTEIN-BASED YOGHURT ( VEGETABLE CURDS )

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( Continued on page 2 )

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*Indian Standard*  
**SPECIFICATION FOR  
VEGETABLE PROTEIN-BASED YOGHURT  
( VEGETABLE CURDS )**

**0. FOREWORD**

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 28 December 1977, after the draft finalized by the Nutrition Sectional Committee had been approved by the Agricultural and Food Products Division Council.

**0.2** Fermented dairy products are consumed by a large section of population in India because of their better digestibility and organoleptic qualities. However, the present supply of milk for preparing such products is limited due to its inadequate production and the high rate of population growth in the country. Efforts have, therefore, been made both by National Institutes as well as private industries to utilize vegetable proteins in the preparation of a yoghurt-like protein-based fermented product. Following successful research and preliminary production trials in preparing a protein-based yoghurt close to natural yoghurt ( from milk ) in organoleptic qualities and nutritive value, public and private sector food industries are considering commercial production and marketing of this product. This standard incorporates the technical experience gained by research and preliminary production trials and is intended to help in producing good-quality product. The process for production of vegetable protein-based yoghurt is described in essentials in Appendix A.

**0.2.1** Considering the improvement effected in protein quality, this standard also includes provisions for fortification with  $\alpha$ -amino acids, and supplementation of vegetable proteins with milk proteins.

**0.2.2** To enhance and widen consumer acceptability, the protein-based yoghurt may also contain permitted edible flavours, colours and extra sugar or sweetening agents.

**0.3** In the preparation of this standard, due consideration has been given to the provisions of the Prevention of Food Adulteration Act, 1954, and the Rules framed thereunder. However, this standard is subject to the restrictions imposed under that Act, wherever applicable.

**0.4** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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## 1. SCOPE

**1.1** This standard prescribes the requirements and the methods of sampling and test for vegetable protein-based yoghurt obtained from protein isolates or other oilseed protein sources and then optionally mixed with milk or milk powder or suitable amino acids, flavoured and sweetened if so desired, and then pasteurized and fermented by lactic acid organisms like *Streptococcus thermophilus* or *Lactobacillus bulgaricus* or any other suitable culture individually or in combination.

**1.2** This standard does not include vegetable milks coagulated by addition of either acid or enzymes.

## 2. TERMINOLOGY

**2.0** For the purpose of this standard, the following definitions shall apply.

**2.1 Routine Tests** — Tests carried out on each lot to check the essential requirements that are likely to vary during production.

**2.2 Type Tests** — Tests to approve the design and micronutrient quality of the product at least at the beginning of marketing or certification, and conducted periodically, thereafter, to check the product quality or whenever the formulation is changed.

**2.3 Acceptance Tests** — Tests carried on samples selected from the lot for the purpose of acceptance of the lot.

## 3. TYPES

**3.1** The protein-based yoghurt shall be any of the following types:

- a) Plain,
- b) Sweetened,
- c) Flavoured, and
- d) Flavoured and sweetened.

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\*Rules for rounding off numerical values ( revised ).

**3.2** Flavoured protein-based yoghurt shall further be identified according to the flavour added, such as vanilla-flavoured, fruit-flavoured or spice-flavoured.

#### **4. REQUIREMENTS**

**4.1 Raw Materials** — The vegetable protein-based yoghurt shall be prepared from high grade protein sources, such as the edible oilseeds themselves or their concentrates or isolates. The organism used shall be as in 1.1.

**4.1.1** The oilseed flours used for the preparation shall conform to the relevant Indian Standards.

**4.1.2** The fats, flavours, colours, emulsifiers, stabilizers, preservatives and sweetening agents used shall be those permitted under the PFA Rules and of good quality.

**4.1.3** The following may also be added to the vegetable protein-based yoghurt.

**4.1.3.1** Edible fruits, fruit pulps or juices, jams and honey may be used. The fruit juices shall be prepared from properly mature fruits, free from seeds, skin and core. They also be pasteurized at 63°C for 30 minutes for destroying pathogens and used immediately. Storage if necessary should be done below 10°C.

**4.1.3.2** Canned or concentrated fruit juices, if used shall comply with the requirements given under the Fruit Products Order, 1955. These additions should not exceed 25 percent by mass of the final product.

**4.1.3.3** Sugar may be added according to the requirements of the consumer and the flavour type.

**4.1.3.4** Stabilizers permitted under the PFA Rules, 1955 when used shall not exceed 0.2 percent by mass of the product.

**4.1.3.5** Preservatives when used shall not exceed the specified limits under PFA Rules, 1955.

NOTE — Sorbic acid and its salts may be used as preservatives.

**4.2 Description** — Vegetable protein-based yoghurt shall be of uniform composition, free from extraneous matter and harmful material, besides pathogenic bacteria. The body and texture of the protein-based yoghurt shall be firm and uniform with negligible whey separation.

**4.3 Organoleptic Quality** — The fermented protein-based yoghurt shall have a pleasing flavour and clean acid taste. It shall not taste rancid, musty, metallic, bitter or flat. The flavour shall not be yeasty, beany, nutty, coarse or over-ripened.

**4.4 Hygienic Conditions** — The product shall be processed, packed, stored and distributed under hygienic conditions in licensed premises ( see IS : 2491-1972\* ).

**4.5** The vegetable protein-based yoghurt shall also conform to the requirements given in Tables 1 and 2.

**TABLE 1 REQUIREMENTS FOR VEGETABLE PROTEIN-BASED YOGHURT ( VEGETABLE CURDS )**

( Clauses 4.5 and 7.1.1 )

Sl. No.	CHARACTERISTIC	REQUIRE-MENT	METHOD OF TEST, REF TO
(1)	(2)	(3)	(4)
i)	Total solids, percent by mass, <i>Min</i>	8.5	Appendix A of IS : 4079-1967*
ii)	Fat, percent by mass, <i>Min</i>	1.5	Appendix C of IS : 1547-1968†
iii)	Protein ( $N \times 6.25$ ), percent by mass, <i>Min</i>	3.0	IS : 7919-1973‡
iv)	Acidity, as lactic acid, percent by mass, <i>Min</i>	0.8	14 of IS : 1479 ( Part I )-1960§
v)	Yeast and mould count per g, <i>Max</i>	100	14 of IS : 3507-1966
vi)	Coliform count per g, <i>Max</i>	10	8 of IS : 1479 ( Part III )-1962¶
vii)	<i>Salmonella</i> sp.	Nil	6 of IS : 5887-1970**

\*Specification for canned *RASOGOLLA*.

†Specification for infant milk foods.

‡Method of determination of protein in foods and feeds.

§Methods of test for dairy industry: Part I Rapid examination of milk.

||Methods of sampling and test for butter.

¶Methods of test for dairy industry: Part III Bacteriological analysis of milk.

\*\*Methods for detection of bacterial responsible for food poisoning and food-borne diseases.

**4.6 Protein Efficiency Ratio** — Protein efficiency ratio of the protein in the protein-based yoghurt shall be not less than 2.0 ( corrected PER ), when determined by the method described in IS : 7481-1974†.

**4.7 Aflatoxin** — The protein-based yoghurt shall not have an aflatoxin content more than 30 µg/kg of food, when tested according to the method prescribed in Appendix J of IS : 4684-1975‡.

\*Code for hygienic conditions for food processing units ( *first revision* ).

†Method for determination of protein efficiency ratio ( PER ).

‡Specification for edible groundnut flour ( expeller pressed ) ( *first revision* ).

TABLE 2 VITAMINS AND MINERALS REQUIREMENT PER 100 GRAMS

( Clauses 4.5 and 7.1.2 )

SL No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST, REF TO
(1)	(2)	(3)	(4)
i)	Vitamin A, $\mu\text{g}$ , <i>Min</i>	50	IS : 5886-1970*
ii)	Vitamin D, $\mu\text{g}$ , <i>Min</i>	0.4	IS : 5835-1970†
iii)	Vitamin B <sub>12</sub> , $\mu\text{g}$ , <i>Min</i>	0.2	see Note
iv)	Folic acid, $\mu\text{g}$ , <i>Min</i>	5.0	do
v)	Pyridoxine ( B <sub>6</sub> ), mg, <i>Min</i>	0.2	do
vi)	Ascorbic acid, mg, <i>Min</i>	5	do
vii)	Thiamine ( as hydrochloride ), mg, <i>Min</i>	0.15	IS : 5398-1969‡
viii)	Riboflavin, mg, <i>Min</i>	0.15	IS : 5399-1969§
ix)	Nicotinic acid, mg, <i>Min</i>	1.0	IS : 5400-1969
x)	Calcium pantothenate, mg, <i>Min</i>	0.2	see Note
xi)	Calcium, mg, <i>Min</i>	100	IS : 1656-1969¶ ( Appendix F )
xii)	Iron, mg, <i>Min</i>	1.0	

NOTE — For checking folic acid, vitamin B<sub>12</sub>, ascorbic acid, pyridoxine ( B<sub>6</sub> ), and calcium pantothenate the manufacturer should maintain a record showing the quantity of these vitamins added to the product.

\*Methods for estimation of carotenes and vitamin A ( retinol ) in foodstuffs.

†Methods for estimation of vitamin D in foodstuffs.

‡Methods for estimation of thiamine ( vitamin B<sub>1</sub> ) in foodstuffs.

§Methods for estimation of riboflavin ( vitamin B<sub>2</sub> ) in foodstuffs.

||Methods for estimation of nicotinic acid ( niacin ) in foodstuffs.

¶Specification for processed cereals weaning foods ( *first revision* ).

**4.8 Urease Activity** — The protein-based yoghurt shall not show a change in pH by more than 1.0 when determined by the method described in Appendix D of IS : 7837-1975\*.

**4.9 Gossypol** — The protein-based yoghurt shall not have a free gossypol content more than 0.065 percent by mass and a total gossypol content of not more than 1.10 percent by mass, when tested according to the method prescribed in Appendix A of IS : 4874-1968†.

NOTE — Aflatoxin content, urease activity and gossypol content shall be determined only if protein derived from groundnut, soyabans and cottonseed respectively have been used in formulating the protein-based yoghurt.

\*Specification for edible full fat soya flour.

†Specification for edible cottonseed flour ( expeller pressed ) ( *first revision* ).

## 5. PACKING AND MARKING

**5.1 Packing** — The protein-based yoghurt shall be filled in wide-mouth glass jars, plastic paper containers or any other suitable containers and capped.

**5.2 Marking** — The following particulars shall be marked legibly and indelibly on each container:

- a) Name of the material and the trade-name or brand name, if any;
- b) Name and address of manufacturer;
- c) Net mass;
- d) Permitted colouring and flavouring agents, if added;
- e) Emulsifiers, stabilizers and preservatives, if added;
- f) Quantity of milk per 100 g;
- g) Calories and proteins per 100 g;
- h) Batch or code number;
- j) Any other details required under Packaged Commodities ( Regulations ) Order, 1975.

**5.2.1** Each container may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution ( Certification Marks ) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

## 6. SAMPLING

**6.1** Samples shall be taken and tested for acceptance of a lot. Each lot shall be tested separately.

**6.2** Representative samples of protein-based yoghurt for testing conformity to this standard shall be drawn as described in Appendix F of IS : 4238-1967\*.

**6.3 Criteria for Conformity** — The lot shall be considered as conforming to the standard if the test samples satisfy all the requirements specified under acceptance tests.

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\*Specification for sterilized milk.

## 7. TESTS

**7.1** Tests shall be carried out as specified in 4.2, 4.3, 4.5 to 4.9 and by appropriate clauses of the relevant Indian Standards.

**7.1.1 Routine Tests** — Routine tests shall be done for requirement given in 4.2, 4.3, 4.5 and Table 1.

**7.1.2 Type Tests** — Type tests shall be done for requirements given in 4.6 to 4.9 and Table 2.

**7.1.3 Acceptance Tests** — Acceptance tests shall be done for the requirements given in 4.2 and 4.3.

**7.2 Quality of Reagents** — Unless specified otherwise, pure chemicals and distilled water ( *see* IS : 1070-1977\* ) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of test analysis.

## APPENDIX A

( Clause 0.2 )

### METHOD OF PRODUCTION OF VEGETABLE PROTEIN-BASED YOGHURT

#### A-1. PROCEDURE

**A-1.1 Preparation of Milk-Like Base** — This consists essentially of the following steps:

- a) Extracting protein from vegetable sources;
- b) Repetizing these proteins at a suitable pH along with salts, vitamins, sweetening agents, etc;
- c) Blending with milk, vegetable fat, emulsifiers, etc, if required;
- d) Adding colouring and flavouring substances, if required;
- e) Preheating, homogenizing and pasteurizing the milk-like base thus obtained; and
- f) Bringing it to desirable temperature before inoculating it with culture.

NOTE — The base may also be made by emulsifying oilseeds like groundnut and soya in water and adding minerals, vitamins, amino acids, liquid glucose or sucrose and milk powder, if required. This could then be homogenized. Fresh milk may be blended if required before pasteurizing and cooling the base.

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\*Specification for water for general laboratory use ( *second revision* ).

**A-1.2 Preparation of Protein-Based Yoghurt by Lactic Acid Fermentation** — The pasteurized and cooled base is inoculated suitably with a freshly-prepared active culture and incubated at suitable temperature for fermentation for a suitable time. After the desired fermentation, the product is cooled to a suitable temperature to control the microbial activity and extend the shelf life of the product.